REMARKS

Claims 1-19 are pending. No amendments to the claims are being offered on account of the Applicant's belief that the claims currently on file are distinguished over the cited prior art.

On page 2 of the Office Action, Figures 1 and 2 are currently objected to under 37 CFR 1.121(d) as failing to indicate that these drawings only illustrate that which is old. Applicants are traversing this objection.

Amended Figures 1 and 2 submitted herewith now bear the legend "Prior Art" and so now conform to 37 CFR 1.121(d).

Numbered section 2 on pages 2-5 of the Office Action currently objects to the specification for lacking all headings and subtitles as well as a cross reference to priority applications. Applicants are also traversing these objections.

Amended pages 1, 2, 3, and 4 now contain the necessary headings as well as a cross reference to the UK patent application from which this application claims priority under the Paris Convention.

On page 5 of the Office Action, claims 1-19 are currently rejected under 35 USC § 103(a) as being unpatentable over US 7,155,642 (hereinafter referred to as "Han) in view of "Processor-Based Turbo Interleaver for Multiple Third Generation Wireless Standards (Shin et al., IEEE Communications Letters, vol. 7, no. 5, 5 May 2003) (hereinafter referred to as "Shin"). Applicants are traversing this rejection.

The application presently contains three independent claims, namely claims 1, 11 and 17. Below, Applicants explain that Han in combination with Shin do not teach all of the elements of claims 1, 11 and 17.

Han relates to a turbo decoder for a radio communication system. The invention of Han particularly relates to an interleaver for a turbo encoder in a UMTS (col. 1, lines 19-21). According to col. 3, lines 51-65, Figure 2 of Han illustrates a structure of an <u>interleaver</u> having a register 200 to store a number, K, of input data bits, and parameters R, C, p, μ and TypeD. In addition, the register 200 stores an inter-row permutation pattern T(j), an intra-row permutation basis sequence s(i) and an intra-row permutation pattern increment arrangement value incr(j). The inter-row permutation pattern T(j) , the intra-row permutation basic sequence s(i) and the intra-

row permutation pattern increase arrangement value incr(j) are provided with values i, j by the register 200 to an address calculator 202.

Turning to col. 7, lines 14-17, the address calculator 202 comprises an intra-row permutation pattern [a(j)] generator 204 and an intra-row permutation pattern storage arrangement part 206. The address calculator 202 also comprises a final address generator 207. According to col. 8, lines 1-3, a data storage 214 reads data corresponding to a finally interleaved address generated by the final address generator 207.

As evidenced by the various tables set out in Han, Han employs a table-based approach to interleaving.

Shin describes a turbo decoder architecture (page 210, right-land column, section III) that, as shown in Figure 2 of Shin, comprises a SISO decoder, a memory Λ_e, an address queue and an interleaver. As described in the last three lines of page 210, the address queue saves an address so that they can be used again as a write address when the SISO produces results after a latency. The interleaver does not comprise the address queue. As indicated in lines 1-7 on page 211, left-hand column, Shin's support for multi-standard interleavers requires the flexibility of a processor.

Shin also teaches, at page 211, right-hand column, lines 13-15, that a multi-standard interleaver can be realized by loading several interleaver programs and switching between them. This is a very clear indication that different sets of instructions are employed to implement different interleavers.

Referring to claim 1, claim 1 recites an interleaver for a turbo encoder and decoder comprising:

- a first table populated with a first set of parameters to allow intra-row permutation of data within an array in accordance with a first wireless communication standard when operation in the first wireless communication standard is required; and
- a second table populated with a second set of parameters to allow inter-row permutation of the data in accordance with the first wireless communication standard when operation in the first wireless communication standard is required wherein the first table is populated with a third set of parameters to

allow intra-row permutation of data within an array in accordance with a second wireless communication standard when operation in the second wireless communication standard is required and to populate the second table with a fourth set of parameters to allow inter-row permutation of the data in accordance with the second wireless communication standard when operation in the second wireless communication standard is required;

- wherein the interleaver further comprises a buffer arranged to compare received interleaved addresses with the size of the data array and to store valid addresses;

- wherein the buffer is arranged to control the flow of data into the interleaver, such that when a predetermined number of addresses have been stored in the buffer the buffer stops the flow of data into the interleaver to allow the outputting of addresses from the buffer to be performed at substantially a constant rate.

Page 6, lines 11-20 of the Office Action states that Han fails to disclose the following features:

- the first table is populated with a third set of parameters to allow intra-row permutation of data within an array in accordance with a second wireless communication standard when operation in the second wireless communication standard is required; and

- to populate the second table with a fourth set of parameters to allow inter-row permutation of the data in accordance with the second wireless communication standard when operation in the second wireless communication standard is required.

Furthermore, page 6, lines 21 – page 7, line 10 of the Office Action asserts that Shin teaches these features. The Office Action points to Figure 1 and Section II on page 210 of Shin in respect of these features. However, <u>Shin fails to teach populating the first table with a third set of parameters to allow intra-row permutation of data within an array in accordance with a second wireless communication standard. Shin also fails to teach populating the second table with a fourth set of parameters to allow inter-row permutation of the data in accordance with the second</u>

wireless communication standard, as recited in claim 1. Instead, Shin teaches use of different programs (having their own respective tables) to accommodate different interleaving schemes, i.e. tables are not re-used.

In passing, the Office Action also asserts that Figure 2, and in particular the address queue, on page 211 of Shin discloses the feature of the interleaver further comprises a buffer arranged to compare received interleaved addresses with the size of the data array and to store valid addresses. However, as mentioned above, the address queue is not part of the interleaver and so Shin does not disclose an interleaver comprising a buffer. Furthermore, the address queue is simply used to store interleaver results for reuse both as read and write addresses. Consequently, it cannot be claimed that the address queue constitutes a buffer arranged to compare received interleaved addresses with the size of the data array and to store the valid addresses. This feature is simply not present in Shin.

Hence, it is respectfully submitted that Han in combination with Shin also fails to teach a buffer arranged to compare received interleaved addresses with the size of the data array and to store the valid addresses, as recited in claim 1.

The Office Action also suggests that Han discloses the feature of the buffer arranged to control the flow of data into the interleaver, such that when a predetermined number of addresses have been stored in the buffer the buffer stops the flow of data into the interleaver to allow the outputting of addresses from the buffer to be performed at substantially a constant rate (page 8, lines 1-5 of the Office Action). In this respect, the Office Action points to the intra-row permutation pattern storage arrangement 206 of Figure 2 of Han. However, the intra-row permutation pattern storage arrangement 206 serves to hold data and not addresses. Furthermore, the intra-row permutation pattern storage arrangement 206 is not designed to control flow of information.

Hence, it is respectfully submitted that Han in combination with Shin further fails to teach that the buffer is arranged to control the flow of data into the interleaver, such that when a predetermined number of addresses have been stored in the buffer the buffer stops the flow of data into the interleaver to allow the outputting of addresses from the buffer to be performed at substantially a constant rate, as recited in claim 1.

In any event, even if the skilled person were to combine the teachings of Han and Shin, the teachings of Shin would simply guide the skilled person to employ

different programs to implement different tables in the manner advocated by Han. Consequently, the resulting combination of teachings would still fail to teach the skilled person that the first table is to be populated with a third set of parameters to allow intra-row permutation of data within an array in accordance with a second wireless communication standard when operation in the second wireless communication standard is required and the second table is to be populated with a fourth set of parameters to allow inter-row permutation of the data in accordance with the second wireless communication standard when operation in the second wireless communication standard is required, as recited in claim 1.

Additionally, it is respectfully submitted that the Office Action fails to establish prima facie obviousness for the following reasons.

However, while cited Han relates to an interleaver for a turbo encoder in a UMTS, the Office Action does not provide anything more than imprecise references to Figure 1 and Section II of Shin. It is therefore respectfully submitted that the Office Action provides insufficient detail, in terms of cited passages from Shin, to communicate the features of Shin believed to be recited in claim 1.

Hence, it is submitted that a sufficient reason has not been provided. Referring to MPEP Section 2143.01, Subsection IV entitled "Mere Statement That The Claimed Invention Is Within the Capabilities of One of Ordinary Skill in the Art is Not Sufficient By Itself To Establish Prima Facie Obviousness." should be followed, this subsection states: "Rejections on obviousness cannot be sustained by mere conclusionary statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.'" KSR Int'l v. Teleflex, Inc., 550 U.S. 127, 82 USPQ2d at 1396 (2007). See also Ex parte Penhasi, BPAI Appeal No. 2007-2534 (December 13, 2007) ("The Examiner has not articulated a sufficient reason why one skilled in the art would have modified [the art] and arrived at the presently claimed subject matter."). It is therefore submitted that the Office Action has not satisfied the necessary criteria of providing a reasoning to combine Han with Shin, because the extremely brief references to Shin do not constitute articulated reasoning and so the rejection raised is improperly formulated. It is respectfully requested that, if further reliance is to be placed on Shin in a future Office Action, specific line reference be provided identifying each feature of Shin believed to be recited in claim 1, for example tables and sets of parameters.

In view of the reasoning provided above, Applicant submits that Han in view of Shin does not render Claim 1 obvious.

Claims 2-10 and 16 depend from claim 1. By virtue of this dependence, claims 2-10 and 16 are also not obvious.

In the event that the above line of argumentation is not accepted and implicit features are believed to be disclosed by the cited art, Applicant respectfully requests that any subsequent Office Action contains a more detailed explanation of those features believed to be implicitly disclosed and reasons why the features are considered implicit.

Claim 17 is directed to a method of interleaving in a turbo encoder and decoder and corresponds to the interleaver of claim 1. Consequently, the arguments set forth above in support of claim 1 apply equally to claim 17. As such, it is therefore respectfully submitted that the teachings of Han in combination with Shin fail to teach populating the first table with a third set of parameters to allow intra-row permutation of data within an array in accordance with a second wireless communication standard when operation in the second wireless communication standard is required, populating the second table with a fourth set of parameters to allow inter-row permutation of the data in accordance with the second wireless communication standard when operation in the second wireless communication standard is required, comparing received interleaved addresses with the size of the data array, and controlling the flow of data into the interleaver, such that when a predetermined number of addresses have been stored in the buffer the buffer stops the flow of data into the interleaver to allow the outputting of addresses from the buffer to be performed at substantially a constant rate, as recited in claim 17.

In view of the reasoning provided above, Applicant submits that Han in view of Shin does not render claim 17 obvious.

Claims 18 and 19 depend from claim 17. By virtue of this dependence, claims 18 and 19 are also not obvious.

Turning to claim 11, page 10, lines 11-20 of the Office Action alleges that Shin teaches, *inter alia*, the output of valid addresses at a substantially constant rate and that the buffer is adapted to compare received interleaved addresses with the size of the data array to determine a validity of a received address. In respect of the latter feature, the Office Action cites page 210, right-hand column, lines 1-18 of Shin. However, the passage cited simply describes a known "prunable block interleaver"

structure. This cited passage does not teach that a comparison of the interleaved addresses and the size of a data array in order to determine a validity of a received address. In this respect, if this passage of Shin is believed to show the above feature, Applicants respectfully request reasons as to why the feature is considered disclosed.

In the absence of any such reasoning, it is respectfully submitted that the combined teachings of Han and Shin fail to teach the output of valid addresses <u>at a substantially constant rate</u> and that the buffer is <u>adapted to compare received interleaved addresses with the size of the data array to determine a validity of a received address</u>, as received in claim 11.

In view of the reasoning provided above, Applicant submits that Han in view of Shin does not render claim 11 obvious.

Claims 12-15 depend from claim 11. By virtue of this dependence, claims 12-15 are also not obvious.

The case is believed to be in condition for allowance and notice to such effect is respectfully requested. If there is any issue that may be resolved, the Examiner is respectfully requested to telephone the undersigned.

If Applicant has overlooked any additional fees, or if any overpayment has been made, the Commissioner is hereby authorized to credit or debit Deposit Account 503079, Freescale Semiconductor, Inc.

Respectfully submitted,

SEND CORRESPONDENCE TO:

Freescale Semiconductor, Inc.
Law Department

Customer Number: 23125

By: /David G. Dolezal/
       David G. Dolezal
       Attorney of Record
       Reg. No.:
       Telephone: (512) 996-6839
       Fax No.:   (512) 996-6854